



Pechora-Kara Seas coast hydrometeorological stress evolution and intensification in recent 35 years

Natalia Shabanova (1) and Stanislav Ogorodov (1,2)

(1) Lomonosov Moscow State University, Faculty of Geography, Moscow, Russian Federation (Nat.Volobuyeva@gmail.com),
(2) Zubov State Oceanographic Institute, Moscow, Russian Federation

Long-term variability of hydrometeorological factors of coastal dynamics in Pechora-Kara region is discussed basing on the station observation data for the 1979 – 2013 period.

The dynamics of Arctic seashore and underwater slope composed of dispersive permafrost ground is determined by hydrometeorological factors, namely, waves and wave currents action coupled to thermal abrasion, which are active during ice-free period. Hydrometeorological stress (forcing) - the combined wave and thermal action together with ice and sea level conditions – is analyzed through air thawing and freezing indexes (sum of summer and winter temperatures), mean annual temperature, wind velocity and directions frequency, ice-free period duration and wave energy flux, calculated by Popov-Sovershaev method [1]. Within climate change, the hydrometeorological stress at the Arctic coast is changing together with coastal retreat rate.

The research showed that the coastal dynamics hydrometeorological factors in Pechora and Kara Seas experienced sub-decadal fluctuations. The thermal indicators as well as wave action had heightened values in 1980ies, decreased in 1990ies, and unprecedentedly increased in the first decade of 2000ies. It is noticeable, that all the constitutes of hydrometeorological forcing experience simultaneously oscillations (except sea level), and hence facilitate and weaken the coastal dynamics all together and at the same time.

In 2006-2013 the hydrometeorological stress is by 30 – 50% higher if compared to 1979 – 2013 mean. There are some coastal retreat rate data of field observation and satellite images analyses fortifying the coastal retreat acceleration in 2006 – 2013 and deceleration in the 1990-ies.

[1] Popov, B. and Sovershaev, V., 1982. Nekotoryye cherty dinamiki arkticheskikh beregov Azii. Voprosy geografii 119 (Morskie berega (Sea coasts)): 105-116. (In Russian)